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ABSTRACT

A recent U.S. Office of Education-sponsored study of the overall impact of educational innovation, the Longitudinal Study of Educational Practices (Project LONGSTEP), showed that student achievement was not related to emphasis on innovation in any substantial or consistently positive way. These findings have been mistakenly interpreted by some as a sweeping criticism of all innovative school practices. A more accurate interpretation, however, is that new educational techniques per se will not automatically guarantee dramatic improvements in achievement. This paper reviews Project LONGSTEP's results and discusses the major policy implications of these findings for decision-makers in both education and government. (Author)

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MAJOR POLICY IMPLICATIONS OF A RECENT LARGE-SCALE LONGITUDINAL STUDY OF EDUCATIONAL INNOVATION*

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Abstract

Major Policy Implications of a Recent Large-Scale Longitudinal Study of Educational Innovation

A recent U. S. Office of Education-sponsored study of the overall impact of educational innovation, the Longitudinal Study of Educational Practices (Project LONGSTEP), showed that student achievement was not related to emphasis on innovation in any substantial or consistently positive way. These findings have been mistakenly interpreted by some as a sweeping criticism of all innovative school practices. A more accurate interpretation, however, is that new educational techniques per se will not automatically guarantee dramatic improvements in achievement. This paper describes Project LONGSTEP and its results and discusses the major policy implications of these findings for decision-makers in both education and in government.

MAJOR POLICY IMPLICATIONS OF A RECENT LARGE-SCALE LONGITUDINAL STUDY OF EDUCATIONAL INNOVATION[1]

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A Review of Project LONGSTEP's Background, Design, Methods, and Findings

The Need

During the late 1960s and early 1970s hopes were very high that intensive, innovative educational programs would exert a dramatic impact on student achievement. Although these hopes have moderated in recent years, there is still the feeling among many individuals, government officials as well as the general public, that if schools undergo major change they will automatically do much better. Many efforts continue to be sponsored at the federal and state levels to encourage such change, either through the development of new programs or through increased emphasis on the dissemination/diffusion of innovations by educational "change agents." The wholesale adoption of educational innovation, however, is an expensive process, and there has been no comprehensive evidence to date that the added costs will necessarily be justified by improved program effectiveness.

Project LONGSTEP

What is the effect of intensive innovation on student performance? Do students achieve more in programs with greater emphasis on innovation? To investigate such questions, the U. S. Office of Education in 1969 awarded a contract to the American Institutes for Research to develop a design for a study of the overall effectiveness of highly intensive, innovative educational practices on students in grades 1 through 12. General emphasis of the resultant Project LONGSTEP (The Longitudinal Study of Educational Practices) was on the identification of changes in student achievement that occurred as a result of intensive educational innovation, "intensive innovation" meaning the implementation of a new program encompassing a significant proportion of students, entailing a major alteration of school procedures, and involving a high investment of resources. In short, the study was

designed to determine whether investment in intensive educational innovation did, in fact, return a "big bang for big bucks."

The initial design was developed, implemented on a limited basis, and modified during the 1969-70 school year. Full implementation began during the 1970-71 school year and continued during the 1971-72 and 1972-73 school years.

The two major objectives of Project LONGSTEP were, first, to determine as comprehensively as possible over a three-year period of time the impact of intensive innovation upon student performance on standardized achievement tests and on measures of educationally relevant attitudes; second, if possible, to attempt to identify the dimensions of educational components (present in the study's select sample of highly intensive, innovative programs) that exhibit the greatest impact on student outcomes.

Selection of Schools and Students

Through a combination of extensive literature search, interviews with program staff, outside consultant review, and site visiting, schools located in 13 school districts were selected and agreed to participate. No attempt was made to select a random sample of schools; rather, our selection rationale was as follows: if innovation in general does have impact on student performance, then its effects should be most visible in schools that are highly innovative. Guidelines for selection emphasized program scope and intensity, instructional content, anticipated program continuation, and willingness to cooperate in a multi-year study. Schools and districts were located in nine states widely dispersed throughout the country. Altogether, some 30,000 students, 80 schools, and 1,500 teachers participated in the study during its three years of implementation.

The 13 districts participating in Project LONGSTEP differed with respect to a number of important school and community characteristics noted during the 1970-71 school year. The communities served by the school districts ranged from 2,500 to over 600,000 in population and varied from rural to urban-metropolitan in setting. Their diversity in socioeconomic level is notable, as evidenced by the percentage of students in the participating schools receiving free or reduced-price lunches. This number ranged from less than 1% to nearly 30%. The reported instructional cost per pupil

in the participating school districts, as of the 1970-71 period, varied from a low of $540 to a high of $1,050. Another indicator of the diversity in the sample was the percentage of minority-group students in the participating schools; this ranged from less than 1% to over 30%.

The educational innovations encompassed by Project LONGSTEP were those that were of particular concern during the late 1960s and early 1970s--most are still of concern today. These innovations included team teaching, multimedia emphasis, unique school design, use of paraprofessionals, variations in scheduling, and teacher-developed materials, as well as independent study, student selection of materials, and a number of other practices typically associated with individualized instruction.

Data Collection

The data collection instruments used by Project LONGSTEP provided information on student cognitive performance, student characteristics, educational experiences, and teacher characteristics. Cognitive performance was measured by the Comprehensive Tests of Basic Skills (CTBS) Forms Q and R for spring testing in grades 2 through 12 and the California Short Form Test of Mental Maturity (CTMM) for testing in grade 1. Student and teacher background characteristics and attitudes were assessed by means of specially developed questionnaires.

An Educational Experience Analysis Guide was developed so that the complex educational experiences present in the study's diverse sample of schools could be described and quantified with respect to specific observable characteristics. The Guide made it possible to locate the educational experiences of participating students on a continuum ranging from traditional to innovative. Use of the Guide also ensured that all students in a school who were receiving essentially the same basic educational experiences would be identified as belonging to the same "educational experience group" and would be distinguished from students receiving different educational experiences, even though both groups of students may have participated in the same school "program." Amount of innovation was measured by an index called level of innovation. This scale was equal to the sum of ten scales derived from the Educational Experience Analysis Guide. Degree of individualization was measured by the sum of just four of the ten scales. These were:

Individualization in Decision Making, Individualization of Instructional Pace, Use of Performance Agreements, and Utilization of Student Evaluation.

Analytic Approach

In order to determine whether program-level emphasis on intensive innovation was related to substantial gains in achievement in Project LONGSTEP's sample of schools, the study assumed that if innovative emphasis did have a dramatic impact on achievement, then:

- the average achievement gains demonstrated by Project LONGSTEP's generally innovative sample of schools should noticeably exceed the gains shown in national norms, and
- variation among schools with respect to innovative emphasis, even within LONGSTEP's sample of primarily innovative schools, should be positively correlated with student achievement.

Underlying these assumptions was the belief that the impact of innovative emphasis was general (i.e., an effect that would be present in different classrooms, schools, and school districts) and would be consistently present in consecutive school years.

Because Project LONGSTEP collected data from students in ongoing school programs, we believed it was essential that the study's key hypotheses be evaluated from a number of slightly different methodological perspectives so as to minimize the possibility that findings would be highly method- or assumption-dependent. Conclusions could then be based on converging lines of evidence. For this reason, the analyses were, by design, as intensive as possible within project time and cost constraints.

Results obtained by means of a given procedure were organized in such a way to enable us to examine and compare (1) the performance of the same group of students across school years and grade levels and (2) the performance of different student groups at the same grade levels but during different school years. Lastly, we examined the findings to see if there were common trends shown by different analytic methods.

The major school attribute examined in most analyses was level of innovation, an index derived from selected items on the Educational

Experience Analysis Guide. As mentioned earlier, degree of individualization in the school program was a component of this index. Separate analyses were conducted for reading and for arithmetic for each of the different grades of students present in the study (i.e., students who were in grades 1 through 12). The level of innovation measure and the teaching qualifications measure used in each analysis pertained to either language arts or arithmetic, depending upon whether reading achievement or arithmetic achievement was being analyzed.[2] Analyses were based upon an examination of growth in achievement between spring 1971 (Year 1) and spring 1972 (Year 2), and between spring 1972 (Year 2) and spring 1973 (Year 3). Analyses of the data for the early elementary grades and high school grades were usually based on from 500 to 900 students per grade. Between 1,200 and 2,000 students per grade were involved in the analyses of students in the upper elementary grades and junior high school grades.

Reading Achievement Findings

Results of the reading achievement analyses showed that the average reading posttest performance at each grade level was fairly similar, even when different groups of students were involved during different school years. For example, the mean posttest CTBS Reading Total Expanded Standard Score was 507 for students who were sixth-graders during 1972-73, and 505 for students who were sixth-graders during the 1971-72 school year. As shown in Figure 1, with the possible exception of growth during the third grade (i.e., between grades 2.7 and 3.7) and during the eighth grade, average posttest scores for the Project LONGSTEP analysis samples were not farther from national norms than were their average pretest scores. Although average pretest and posttest reading achievement for almost all analysis samples were above national norms, it is obvious that the average gains shown by the set of fairly innovative schools participating in Project LONGSTEP did not notably exceed the growth expected on the basis of CTBS norms.

Although conspicuous growth in achievement was not generally present in Project LONGSTEP's sample, it did seem possible that poor performance of students who were members of schools with a lesser emphasis on innovation may have offset unusually good performance of students who were members of the more innovative schools in these analyses of spring-to-spring changes

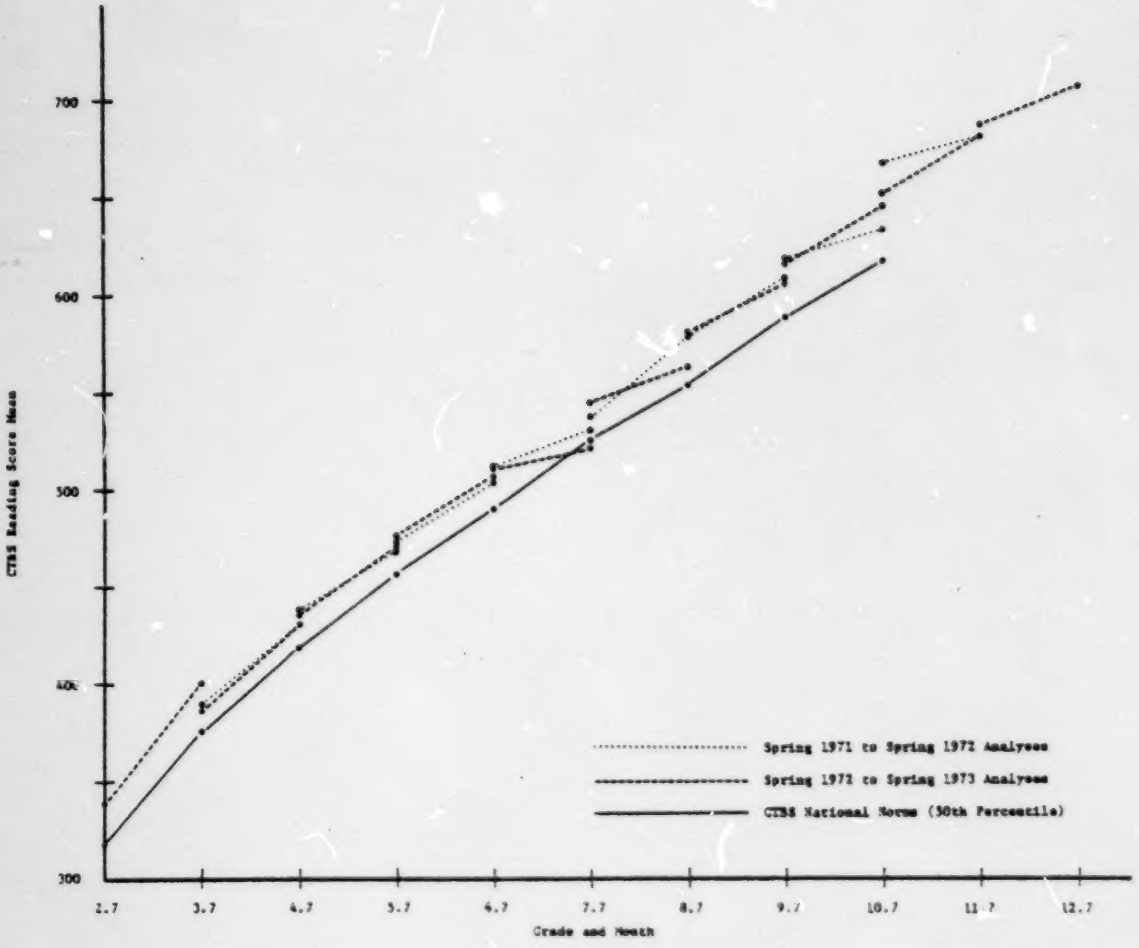

Figure 1. Pretest and posttest averages and published national norms (50th percentile for spring testing) - Reading analyses.

in average reading scores (shown in Figure 1). To determine if growth in reading achievement at a given grade level was related to the emphasis on innovation to which students were exposed, we analyzed an educational growth model in which student achievement was related to school differences in innovative emphasis on language arts, number of minutes per day (spent on class activities in language arts), student pretest level, student socioeconomic background, and teaching qualifications of students' language arts teachers. Examination of the results showed that there was no consistent relationship between growth in reading achievement and level of innovation, number of minutes per day, and teaching qualifications that held true for a majority of the grades analyzed.

Next, we considered the possibility that program-level emphasis on innovation may not have been substantially related to achievement for the majority of students in a particular school and grade but may have been extremely important for some students. To detect such associations, those students who, for two consecutive school years, achieved more than was expected on the basis of their particular pretest scores and socioeconomic background were identified. A comparison group was formed from those students who showed notable lack of growth during two consecutive school years. Subsequent analyses showed that underachievement or overachievement was not highly or consistently related to either level of innovation, number of minutes per day, or teaching qualifications across all analyses. These analyses, however, also yielded the following additional but tentative findings:

- Relative to underachieving students, overachieving students who were in elementary and junior high school in Year 1 tended to be members of programs that had a lower level of innovation (on the average) during Year 2 and again during Year 3.
- Overachievers who were in grades 1 through 5 during Year 1 were usually exposed to more language arts activities than were underachievers during Year 2 but less time (relative to underachievers) in Year 3.
- In a number of the analyses, overachievers were exposed to language arts teachers (either during Year 2

or year 3), who, on the average, had a higher teacher qualifications score than did the teachers of the underachievers.

Arithmetic Achievement Findings

Average posttest arithmetic performance was usually fairly similar for different groups of students at the same grade level (see Figure 2). However, with the possible exception of the growth demonstrated during the third grade (i.e., between grades 2.7 and 3.7), average posttest CTBS Arithmetic Total Scores were not conspicuously farther from national norms than were their average pretest scores. Since one of the major criteria for selection to participate in Project LONGSTEP was departure from "traditional" classroom practices, these overall results do not support the hypothesis that greater program-level emphasis on innovation is positively related to notable gains in arithmetic achievement.

As in the analyses of reading achievement, we thought that these overall analyses of average gains in arithmetic achievement might have hidden the fact that the most innovative schools within each grade were having great positive impact and that the overall results were being diluted by less innovative schools having little impact. Further analyses (i.e., analyses of our educational growth model) showed that program-level emphasis on innovation in arithmetic was not highly related to growth in arithmetic achievement. In fact, the predominance of the small associations between achievement and innovative emphasis in arithmetic were negative. The average number of minutes per day of arithmetic instruction was fairly constant across all grades. However, within a number of early elementary school and high school grade levels, there was a small but positive association between achievement growth and number of minutes per day of arithmetic instruction. Lastly, there was a trend in these analyses for there to be small but positive associations between growth in arithmetic achievement and the level of teaching qualifications of students' arithmetic teachers.

We then identified those students who, for two consecutive school years, had demonstrated unusually large gains in arithmetic achievement (in relation to their particular pretest scores and socioeconomic background). Students who had shown a notable lack of growth in arithmetic

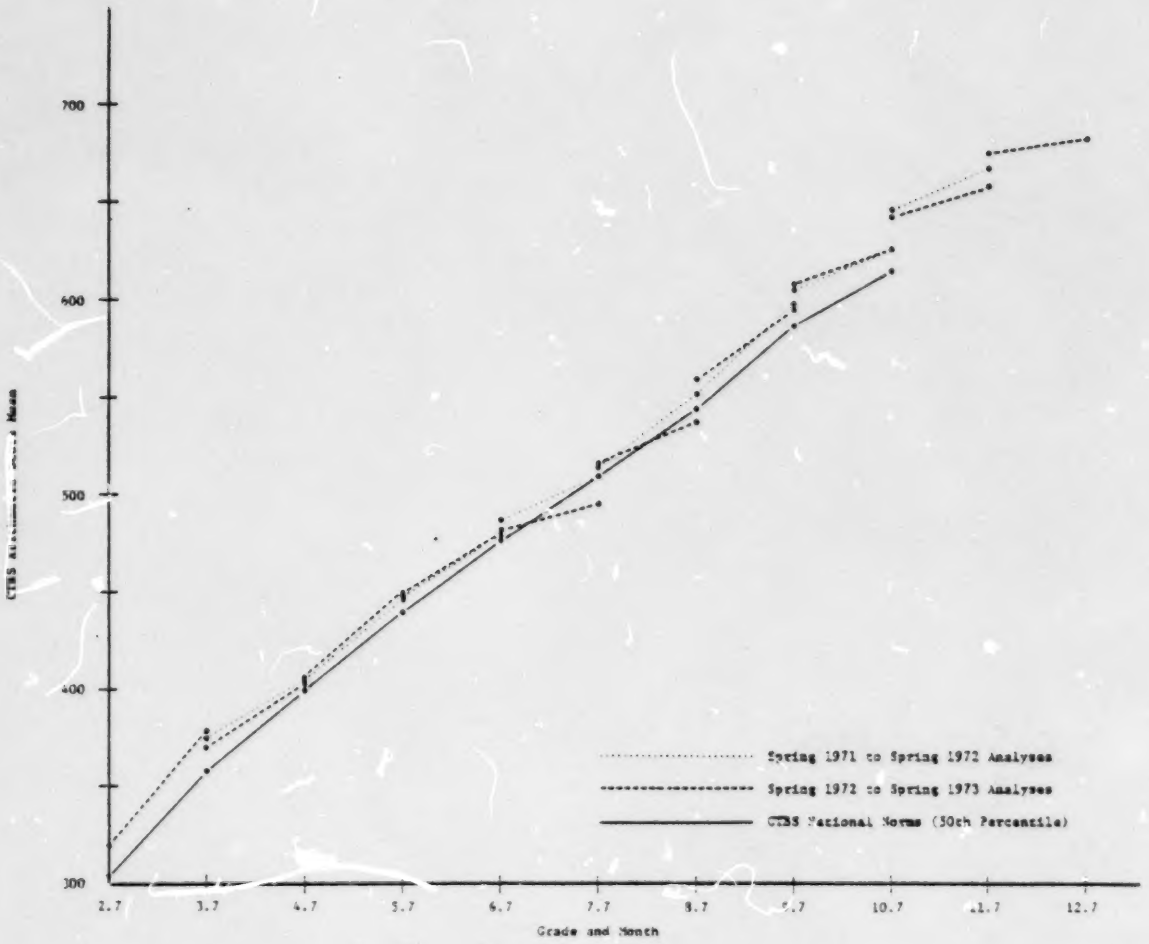

Figure 2. Pretest and posttest averages and published national norms (50th percentile for spring testing) - Arithmetic analyses.

achievement were also identified. Analyses of these two groups of students suggested the following tentative conclusions:

- Relative to underachievers, overachievers in arithmetic who were in elementary and junior high schools during Year 1 tended to be members of programs during Year 3 that, on the average, had a slightly lower emphasis on innovation.
- Overachievers in the early elementary and late high school grades tended to be exposed to somewhat more instruction in arithmetic than underachievers.
- The teaching qualifications of the arithmetic teachers of overachievers were, on the average, higher than those of the arithmetic teachers of underachievers.

Can Schools Have a Substantial Impact on Education Achievement?

Even though our overall project findings showed that substantial educational growth was not uniquely associated with program emphasis on innovation, it should not be concluded that substantial growth was absent in the schools participating in Project LONGSTEP. On the contrary, a number of schools were identified whose students, on the average, did much better than was predicted from their pretest and SES level. For example, the sixth grade students in the most effective reading treatment groups had average pretest scores ranging between the 48th and 69th percentiles. At posttest, one year later, their average reading scores ranged between the 63rd and 79th percentiles.

These findings certainly are not surprising to teachers, principals, or parents. However, they do tend to counter the overly pessimistic conclusions concerning school effects that have been drawn from some previous educational evaluation studies.

Overall Findings and Discussion

The single, most important and well-documented finding of Project LONGSTEP was the lack of either substantial or consistent association between student achievement and overall level of innovation across grades.

In fact, relative to the sample of schools participating in the project, students enrolled in programs with a more moderate emphasis on innovation and individualization showed the greatest improvement.

From the standpoint of time spent per day on language arts activities, it appeared that consistently overachieving second and third graders in Project LONGSTEP typically were members of programs that allocated more time to such instruction in the second grade. These findings suggest that increasing the amount of class time per day, especially in the first and second grades, may be a worthwhile strategy for improving student performance in language arts.

In the arithmetic area and, to a lesser extent, in the language arts area, there was a tendency for teacher qualifications to be positively related to student achievement.

Although not discussed earlier, our various analyses also suggested that the impact of schools on student achievement was inversely related to grade level. These findings may have reflected a general learning curve phenomenon or perhaps some artifact of test scaling. Nevertheless, they do tend to support the view that the greatest potential payoff from the investment of future educational research and instructional development funds may come from increased attention to improving education in the early elementary grades.

It is less obvious why one particular aspect of much recent innovation, that is, increased individualization of education, was not shown to be clearly and consistently effective in Project LONGSTEP. We would like to discuss some of the possible explanations for this finding, but it should be emphasized that these are purely speculative. One possibility is that not all modes of "individualization" operate effectively and that our index, degree of individualization, failed to tap some crucial differences between individualized programs that are effective and those that are not.

The amount of independence and decision-making left to the student could also be crucial. While tailoring the educational process or teaching strategy to an individual student's needs or learning style may be very effective, allowing the student a great deal of independence in selecting the topics to be studied, in deciding the amount of time to be spent on a particular topic, and in establishing the level or standard of

attainment during a school year could have a negative impact on performance (as measured by standardized achievement tests) for all but the highly motivated. Anecdotal experiences gained over the years of association with schools participating in Project LONGSTEP suggest that some students tend to lose momentum unless the teacher provides the kind of individual attention that is unlikely except when a sufficient number of qualified assistants are available.

This problem of student motivation was discussed by Lipson[3] in his explanation of the possible reasons why the IPI (Individually Prescribed Instruction) mathematics modules did not produce the dramatic gains that had been expected. To a large extent, his comments apply to a number of other individualized programs. According to Lipson, the process of each student working alone on his instructional module can have a very detrimental effect on motivation, in contrast to a conventional classroom where the group provides competition and a feeling of importance to the activities. "The student's relationship to the other members of the class and to the teacher creates a sense of obligation for some level of performance. The rhythm of the class, the rituals of class activity--even when we grumble--give our lives a pattern to follow. The progress of the class is like a tide which carries all the swimmers along even though some are slower and some are faster."[4] In concluding, Lipson expresses the hope that new systems will be developed "which build upon the combined strengths of the classroom approach and the modularized and individualized approaches."

The fact that our degree of individualization index failed to discriminate between successful and unsuccessful educational approaches also suggests the possibility that we may have overlooked some elements of individualization that occur in conventional classrooms. It could be that individualization is one of the practices that distinguishes good teachers from poor ones, even in traditional educational environments where there is no "experimental" or "innovative" program claiming to be individualized. Perhaps the good teacher individualizes informally and so naturally that he or she is not even aware of it in these terms. The good teacher does not treat all children as interchangeable cogs, but rather as the individuals they are. This kind of informal individualization would not be noted as a feature of an educational program in Project LONGSTEP--but it may nevertheless be very effective.

These speculations, if correct, would extend to the elementary school level the interpretation of some loosely comparable findings at the high school level, based on Project TALENT da'..[5] Analyzing Project TALENT retest data, Shaycoft found evidence, as had Project LONGSTEP, that schools differ in effectiveness. However, she failed to find, as LONGSTEP has failed to find, that these differences were meaningfully related to available variables in any way that might have been expected.

On the other hand, it is also possible that large overall educational effects were not demonstrated in Project LONGSTEP (or have not been found in many educational evaluation efforts) because such effects have been attenuated by inappropriate matches between educational approaches and student needs. The undoubtedly dramatic growth in achievement demonstrated during two consecutive school years by a number of students participating in Project LONGSTEP certainly suggests that some near-optimal match of student and educational approach may have been one of the reasons for the gains of these students.

Major Policy Implications of Project LONGSTEP

Because of the current controversy between proponents of traditional educational approaches and proponents of innovative educational practices, Project LONGSTEP has been of great interest to the public, to educators and researchers, and to the news media. The American Institutes for Research and the U. S. Office of Education, did, in fact, receive thousands of requests for Project LONGSTEP final reports during the six-month period after the study was released. Since Project LONGSTEP's results have implications for legislation and for policies regarding the development of "new" educational programs, this last section restates the study's key findings and clarifies what the authors believe to be its major policy implications for decision-makers in education and in government. Our findings and recommendations have been organized into four major question areas:

Does Educational Innovation per se Have a Dramatic Impact on Achievement?

The most significant finding of Project LONGSTEP was the lack of either substantial or consistent association between student growth in achievement (as measured by standardized achievement tests[6]) and the amount of school

emphasis on innovation in their language arts and mathematics programs. In fact, some of the evidence suggested that students enrolled in programs with a more moderate emphasis on innovation showed greater improvement in test scores. Further, preliminary analyses showed that, on the average, these findings applied equally well to students at different socioeconomic levels and at different pretest levels. The expectation that substantial average yearly gains in student achievement would occur for a sample of intensive innovative school programs was not supported by Project LONGSTEP. Emphasis on innovation also was not substantially or consistently related to a composite index of attitudes toward school.

These findings imply that educational quality is not synonymous with innovation per se. They also suggest that innovation should not be viewed as a general solution to educational problems. Rather, it is more realistic to expect--and the Project LONGSTEP data support this expectation--that some changes will be improvements, some changes will be detrimental, and some changes will not matter at all. In short, the findings of Project LONGSTEP suggest that more innovation is not necessarily better education.

Can Schools Have a Substantial Impact on Educational Achievement?

Even though overall project findings showed that dramatic school effects were not associated with emphasis on educational innovation, different educational approaches did produce meaningful and important differences in student achievement, especially in the early elementary grades. Unusually large gains in reading, language arts, and arithmetic skills, over and above those expected on the basis of pretest and socioeconomic background were found in a number of the participating schools. However, these gains, on the average, were not related to the amount of school emphasis upon innovation. Further research and evaluation efforts should be directed at identifying the correlates of such significant educational gains.

Should Education Return to the Traditional 3-R's Approach?

The results of Project LONGSTEP do not imply that schools should stop experimenting with new school practices nor that they should indiscriminately discontinue "innovative" practices and replace them with more "basic" approaches to instruction. Rather, the findings should dispel the notion

that educational quality is synonymous with innovation and that all innovations and changes in school practices are automatically good.

Selected innovative strategies as well as traditional strategies will undoubtedly prove to be valuable in future years. In designing the kinds of educational programs to be implemented in a given community, all factors in the educational process should be considered--the characteristics of students, parents, and teachers, and the available resources. We suggest that educators identify and select those strategies which are the most appropriate for the educational goals of their communities, recognizing that every change will not necessarily be a change for the better. To ensure that valuable approaches are retained and ineffective strategies are discontinued, educators must be encouraged to gather evidence as to which aspects of their programs are most effective for their students.

What Are the Major Policy Implications of Project LONGSTEP for Decision-makers in Education and in Government?

We again would like to emphasize that Project LONGSTEP should not be viewed as providing evidence for the ineffectiveness of all innovative school practices. Neither does it support the value of all traditional approaches. Our experiences, and those of other researchers as well, suggest that there are no automatic guarantees of success in education, no matter what educational program strategies are adopted, whether they be innovative, traditional, or some mixture of new and old educational practices.

We believe that educational innovation, like the more traditional approaches, should be considered a means to an end, and not an end in itself. Thus, we are concerned that education projects may be funded primarily because the methods used are new or innovative. There is a danger in being overly concerned with the uniqueness or originality of the technique rather than with its promise in solving a significant educational problem.

Therefore, we recommend that financial support for experiemental projects should be continued, but only when there is strong reason to believe that the proposed approach--whether it be totally new, a mixture of new and traditional practices, or an adaptation of traditional approaches--

is appropriate for the students, teachers, and parents involved and that it is likely to achieve an important educational goal.

Lastly, to ensure that valuable approaches are retained and that ineffective approaches are dropped or modified appropriately, we would recommend that (1) all new education projects be rigorously evaluated from their beginning, (2) sufficient resources be provided to accomplish this goal, and (3) findings regarding the implementation process and the impact on students be taken into account when making decisions concerning the funding of education projects.

Reference Notes

1. The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare (Contract Number OEC-0-70-4789). Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

2. Attitude measures were collected and analyzed but, due to space limitations, could not be reported here. In brief, we were unable to demonstrate any meaningful relationships between attitudes toward school and emphasis on innovation in the school program.

3. Lipson, J. I. IPI math--An example of what's right and wrong with individualized modular programs. Learning, March 1974, 2(7), 60-61.

4. Ibid., p. 60.

5. Shaycoft, M. F. The high school years: Growth in cognitive skills. (Interim report 3 to the U.S. Office of Education, Cooperative Research Project No. 3051). Pittsburgh: American Institutes for Research and the University of Pittsburgh, 1967.

6. Preliminary analyses showed that the objectives underlying the items in the standardized tests used were present in virtually all of the school programs included in the sample.